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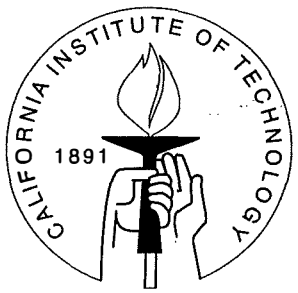
PASADENA, CALIFORNIA 91125

BANK STRUCTURE AND GROWTH: INSIGHTS FROM BRITISH AND GERMAN BANK BALANCE SHEETS BEFORE WORLD WAR I

Caroline M. Fohlin



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Abstract

Financial institutions may enhance economic growth by raising the quantity, quality (productivity), and efficiency of investment. The structure of the German system is thought by many to have amplified these beneficial effects. Orthodox paradigms hold that through direct involvement with firms, the German universal banks funneled substantial amounts of financial capital into industry and credibly committed to behaving in the long-run interest of firms. At the same time, by avoiding such engagement with industrial companies, British banks are thought to have disadvantaged that country's economy with respect to its continental counterparts. This paper uses aggregate bank balance sheet data to investigate systematic differences in the financial makeup and activities of universal and specialized banks. The paper first measures the rate of expansion and the ultimate magnitude of capital mobilized by the British and German banks. It then investigates the makeup of banks' asset portfolios and estimates the extent of direct involvement in equity ownership by the two types of banks. The findings suggest that, compared to the British banks, the German banks maintained at least as much liquidity relative to their short-term liabilities and held approximately the same (small) proportion of their assets in the form of non-government securities. Furthermore, the German banks seem to have held only a limited number of industrial equities in their portfolios and often did so merely because of insufficient markets for new issues. The findings suggest that the commonly-perceived gulf between specialized and universal banking may exaggerate the real differences in the systems' influences on economic growth and industrial development.

Bank Structure and Growth: Insights from British and German Bank Balance Sheets Before World War I

Caroline Fohlin[1]
California Institute of Technology

> "The picture presented by the balance sheets of the banks must necessarily reflect that of the entire national economy, since the banks are the cash keepers of the nation. It is, therefore, hardly in accord with the truth to speak of or object to the banks as the 'leaders of national enterprise' or of domestic economic activity."[2]

While most economists recognize that the financial system is a crucial component of any economy, there is much disagreement over the manner in which financial and real variables interact. The idea that financial institutions can actively promote growth is quite old. Joseph Schumpeter (1912) argued that bankers, through their screening and funding of entrepreneurs, encourage innovative activity and thereby spur economic growth. Thus, the early writing on the financial system took as a given both the asymmetry of information between investors and entrepreneurs and the role of the financial system in ameliorating such information problems.

Modern growth theory stresses the acquisition of human capital and the productivity of economic units (firms and entrepreneurs) as well as the traditionally-emphasized expansion of the physical capital stock. This literature has also made strides in incorporating the financial system into models of endogenous growth. The recent work of Robert King and Ross Levine (1993), for example, formalizes the Schumpeterian view into the framework of an endogenous growth model. In their model, the financial system affects productivity growth through four channels: screening prospective entrepreneurs in order to select the most promising projects,

[1]I am grateful to Lance Davis, Barry Eichengreen, John Latting, and Peter Temin for helpful comments and discussions and to the NSF (grant # SBR-9617799) for funding this research.

[2]Jakob Riesser (1911), p. 566.

mobilizing capital to fund investments, diversifying investors' portfolios to eliminate risk, and revealing the potential benefits of participating in productivity-enhancing activities.

Expansion of the financial sector has proven to go hand in hand with economic growth, but the direction of causality is still uncertain.[3] Joan Robinson (1952) suggested that financial systems develop in response to prospects in the real sector, yet the literature over the last decade has tended to argue that the real sector responds to financial development. The evidence seems to support the view that the extent and depth of the financial system positively correlates with future economic growth, but problems of omitted variables and robustness undermine such findings.[4] Jeremy Greenwood and Bruce Smith (1997) offer what may be the most reasonable compromise: a model in which financial markets arise after some period of real development, and the expansion of those markets fuels further real growth.[5]

Despite the burgeoning research on finance and growth, the importance of financial system structure has yet to be determined. Much of the debate over banking reform in the United States hinges on the assumption that certain types of financial systems allocate an economy's resources more efficiently than others. There is a widespread sense in the US and the UK that the universal banking systems of Germany and Japan have given those countries an advantage in industrial development and economic growth over much of the past century and a half.

The German banks in particular have been lauded for their role during the period of industrialization before World War I. The perceived advantages of the German-style banks revolve

[3]Early studies include Goldsmith (1969), McKinnon (1973), and Shaw (1973).

[4]The more recent literature considering the causal relationship between finance and growth includes King and Levine (1993), Tullio Japelli and Marco Pagano (1993), Jith Jayaratne and Philip Strahan (1996), and Rajan and Zingales (1997). Robert Lucas (1988), perhaps not surprisingly, expresses doubt about the importance of financial factors and excludes these considerations in his model of development.

[5]A logical implication of this model is that exogenous creation of a financial system with advanced features may not spur real growth. The problem then for implementing development policy is determining how to get poor countries to the point at which financial systems will arise endogenously.

around both the organization of the banks and the policies of the banks' operators. The combination of commercial banking, securities underwriting, and brokerage services characteristic of the universal banks is thought by many to have yielded economies of scope and therefore greater efficiency. Such efficiency has been argued in turn to have reduced the costs of finance and thus promoted industrial investment.[6] Furthermore, the much-emphasized close, long-term relationships German banks are thought to have maintained with industrial firms arguably aligned the incentives of banks and firms and encouraged multi-period optimization of their behavior. The German banks are variously credited with mobilizing capital for domestic industry, screening potential entrepreneurs, promoting and re-organizing whole industries, deciding on investment and production strategies, monitoring the progress of clients' investments, arranging and enforcing propitious industrial combinations, and diversifying the risk associated with innovative activities.

In contrast, the banks have become a perennial scapegoat for the apparent under-performance of the British economy since the late Victorian era. A long line of critics has assumed that British industry has been constrained by a lack of capital and that the banks could have, but refused to, provide necessary finance to industry. Moreover, many have chastised the British banks for avoiding engagement with domestic industry and leaving firms to find finance from other sources. The banks' involvement in foreign and imperial ventures is claimed to have drained away funds from domestic industry; firms' resultant recourse to securities markets is argued to have advanced investors' short-term profit motives at the expense of long-term growth.[7]

[6]Most recently, Charles Calomiris (1995) has advanced this idea.

[7]For a review of the literature on British banking and industrial development, see Michael Collins (1991). Also see Forrest Capie and Collins (1992). For a critical appraisal of the British banking system, see George

In short, the German banks are thought not only to have engaged in all of the activities seen as central to the Schumpeterian model of finance and growth, but to have executed these functions more effectively and efficiently than the British banks. In light of the continuing debates over the relative efficacy of German and British banking, at least two lines of historical investigation need to be pursued. The first step is to establish the extent to which the German banks offered the myriad benefits that have been ascribed to them; the second step is to determine whether the provision of these services by a single institution (that is, the universal banks) created synergies that fueled economic growth.

The British banks were not, however, prohibited from combining functions or from pursuing long-term relationships with industrial firms. Thus, research on the real effects of financial structure must accept that, if the British banks' organization and activities were sub-optimal for industrial growth, such inefficiency stemmed from market failures of one sort or another: rationing of relatively low-return or high-risk ventures or inability to perceive or act upon favorable prospects.[8] Moreover, most of the growth literature that incorporates a financial sector makes little distinction among systems. The empirical literature considers all components of the financial system together in measuring financial development, and recent cross-country comparisons typically find correlations between real growth and financial depth broadly defined. If the significant divide in growth rates arises between more- and less-developed financial systems, then economists and historians must also contend with the possibility that the form of the financial system yields second-order effects on productivity and growth.

Edwards (1987).

[8]It seems that specialized institutions staked out certain territories in the financial system, and those divisions may have been difficult to overcome. Nonetheless, the deposit banks did inch toward investment and brokerage services toward the end of the nineteenth century. Ironically, at the same time, many Germans were calling for reform of the universal banks into a specialized system modeled along British lines.

A principle reason for the persistence of debates over the relative benefits of particular financial systems is that the research thus far largely evaluates systems independently of one another.[9] Thus, individual country studies often measure the given systems against imaginary yardsticks. This paper uses aggregate bank balance sheet data to investigate systematic differences in the financial makeup and activities of universal and specialized banks. By explicitly comparing the British and German banks, this work takes steps toward quantifying the possible disparity in financial system growth effects over the decades leading up to World War One.

Financial systems are thought to influence both the quantity and quality of investment. Thus, this paper first measures the rate of expansion and the ultimate magnitude of capital mobilized by the British and German banks. The paper then investigates the makeup of banks' asset portfolios and estimates the extent of direct involvement in equity ownership by the two types of banks. The findings suggest that, compared to the British banks, the German banks maintained at least as much liquidity relative to their short-term liabilities and held approximately the same (small) proportion of their assets in the form of non-government securities. Furthermore, the German banks seem to have held only a limited number of industrial equities in their portfolios and often did so merely because of insufficient markets for new issues.

The results offer insights into both differences and similarities in the organization of banking in Germany and the UK specifically and into the historical importance of financial structure more generally. The findings suggest that the commonly-perceived gulf between specialized and

[9]Tilly (1986), an important exception, compares the British and German systems along several lines and finds some notable similarities as well as differences. Colin Mayer (1988) and Julian Franks and Mayer (1995) provide abundant evidence on financial and corporate structure for several European countries and the US and Japan. This work, however, does not make the connection to economic growth. George Edwards (1987) makes some international comparisons in his wide-ranging critique of the British banking system; Calomiris (1995) contrasts the US and German systems and attempts to estimate relative costs of securities underwriting; and William Kennedy and Rachel Britton (1985) compare portfolio efficiency in Britain and Germany.

universal banking may exaggerate the real differences in the systems' influence on economic growth and industrial development.

The Link Between Bank Structure and Growth

The fundamental role of the financial system in any economy is to mediate between the supply of and demand for capital. In doing so, intermediaries mobilize otherwise idle resources to be used in productive investment. In order to formalize the link between the functioning of the financial system and the growth of the real economy, a wide array of theoretical models has appeared in the growth and development literatures in the past decade.[10] For their motivation, nearly all appeal to the observed correlations between financial system development and industrial growth uncovered by economic historians and development economists during the 1960s and '70s.[11]

Financial intermediaries can be made to arise in endogenous growth models by assuming heterogeneity in the quality of entrepreneurs and projects, possible monopoly returns to innovation, relatively large-scale and illiquid capital requirements, and the potential to diversify risk through pooling. In comparison to the traditional growth models, in which output was seen as a function of capital, labor, and disembodied technological progress, the current models provide a richer framework for interpreting the potential impact of financial systems.[12]

Pagano (1993) provides a simple way to summarize the newer models of finance and growth. Assuming away the complications of population growth, intermediate goods, and market struc-

[10]For an overview of some of the literature see Marco Pagano (1993) and Alexander Galetovic (1996). Jeremy Greenwood and Bruce Smith (1997) provide more technical details.

[11]Cameron (1967), Goldsmith (1969), McKinnon (1973), and Shaw (1973) are the standard references.

[12]In the older models, the relationship between output (Y_t), physical capital (K_t), and labor (L_t) is defined as $Y_t = A_t F(K_t, N_t)$; and A_t is assumed to be productivity. Then output growth can be formulated as $\dot{Y}/Y = \dot{K}/K + \dot{L}/L + \dot{A}/A$.

ture, endogenous growth models yield a reduced-form equation in which output is a linear function of capital (K_t), $Y_t = AK_t$. This formulation arises from the models related to those of both Paul Romer (1989) and Robert Lucas (1988).[13] Ignoring depreciation and assuming a closed economy with no government sector, gross investment (I_t) is the first difference of the capital stock and is equal in equilibrium to net savings (ϕS_t). Net savings is simply that portion of gross savings not expended on the costs of intermediation ($1 - \phi$).

The steady-state growth rate of output, $\dot{Y}/Y$, is equivalent to the growth rate of capital, $\dot{K}/K$. Using the capital market equilibrium condition yields

$$g = A\phi s, \tag{1}$$

where s is the gross savings rate, S/Y. This relationship underscores the primary links between the financial system and growth rates. Financial institutions may enhance economic growth by raising the total quantity of financial capital available to entrepreneurs (s), improving the quality (productivity) of investments (A), and increasing the efficiency of intermediation between the sources and uses of funds (ϕ).[14]

This framework can help in comparing the effectiveness of the German and British banking systems, but further refinement is required in order to clarify the ways in which financial institutions affect the variables in the growth formula. The following sections take some first

[13] In the Romer model, N identical firms produce with a constant returns production function, $y_t = Bk_t^{\alpha}$, and productivity increases in the capital stock ($B = Ak_t^{1-\alpha}$). Aggregate output is simply N times an individual firm's output. In the Lucas model, K_t is a composite of physical and human capital.

[14] The reduced-form version of the model does not prove that the existence of financial systems increases growth over the rates obtained under financial autarky. Greenwood and Smith (1997) provide a first step toward thinking about such distinctions; showing that growth rates obtained in economies with either banks or equity markets exceed those of economies without financial intermediaries. Though most of the literature offers no comparison of the relative benefits of different types of financial systems, the Greenwood and Smith (1997) model shows that, with sufficient risk aversion on the part of the investing public, equity markets produce stronger growth than do banks. Further theoretical inroads into such questions are still required.

steps at comparing the impact of specialized and universal banking systems on the quantity and quality of investment.

Quantity of Investment

Theories of economic growth, both old and new, indicate a role for banks in the expansion of capital. Banks typically influence the accumulation of physical capital by directing funds to entrepreneurs who wish to invest. Such capital mobilization proceeds in two stages: collection of capital through deposit taking or sales of equity shares, and dispersion of the gathered funds in the form of loans or advances. By repeating this process, the banking system multiply expands the money supply and effectively redistributes the economy's capital. These banking functions increase the share of resources directed to productive investment (s in equation 1).

The German universal banks have often been credited with mobilizing significant amounts of capital from the public and thereby promoting industrial growth. The British banks, by comparison, are typically presumed to have participated less aggressively in the accumulation of funds. Goldsmith's international tabulation of financial system assets allows direct comparison of the magnitude of capital mobilized by the banks and also illuminates the institutional structures in the two countries at various points between 1860 and 1913 (Table I).

Total assets of financial institutions as a share of gross national product grew substantially in both Britain and Germany over the period but expanded more in the latter than in the former. Furthermore, while Britain's ratio exceeded Germany's in 1860, the British lagged the Germans by 1900. The gap grew to over 50 percent by World War I.[15]

Table I here.

[15]The pattern reversed after the wars, and as of 1963, Britain led Germany again by a substantial margin.

The differences in structure of the British and German financial sectors complicates direct comparison of the two cases. Virtually all of the functions relating to corporate finance fell under the purview of one institution in Germany: the ~~uni~~versal bank. The British financial system did not observe a strict dichotomy between long-term, investment banking and short-term commercial services, but only the German system explicitly combined the two types of business. Formal securities markets provide complementary services to those offered by banks, and the former presumably represent a greater portion of the financial system in Britain than in Germany. Furthermore, much secondary securities trading fell outside of the British banks' operations but within those of the Germans' business. Thus, comparing the German universal banks to the British deposit (commercial) banks underestimates the share of corporate financing institutions in the British economy. Nonetheless, at 50 to 60 percent, British deposit banks and private banks accounted for twice the share of total financial institution assets in that country as the German universal banks (of both joint-stock and private forms) did in Germany. When the British discount houses and investment trusts are included, the gap widens.

Given the traditional emphasis on the universal banks' role in the promotion of industrialization and economic growth in Germany, the share of the universal banks in both financial assets and GNP seems relatively small. Furthermore, the sharp increase in the share of the universal banks in Germany between 1900 and 1913, especially compared to the more gradual increases (or decline, when the private banks are included) from 1860 to 1880, raises doubts about the causal link from the expansion of the universal banks to the growth of industry.

In contrast, the largest increase in the British deposit banks' share of assets came between 1860 and 1880, and the growth rate leveled off thereafter. This pattern is closer to the expectations for the prevalence of financial institutions over the development of the economy: as

the economy matures, the banks should play a diminishing role in the mobilization of capital. Part of the difference in the changing prevalence of the British and German banks in the economy may stem from the structure and practices of those banks. The German universal banks are widely reputed as having internalized the secondary market in securities. The continued expansion of the universal banks, therefore, may represent the expansion of the market for securities.

The ultimate impact of the banks' activities depends directly on the amount of funds assembled by the financial system and inversely upon the proportion of the system's assets retained in the form of cash reserves. In a simple model of a monetary economy with financial intermediaries and currency holding by the public, the total nominal money stock (M1) is a function of the nominal monetary base (currency plus reserves), the ratio of bank deposits to currency, and the cash reserve ratio.[16]

$$(M1)_t = \left[\frac{1 + H_t(1 - \gamma_t)}{Q_t}\right] \times M_t, \tag{2}$$

such that H_t is the real stock of inside money (deposits), Q_t is the real stock of currency balances, γ is the cash reserve ratio, and M_t is the nominal monetary base. Financial intermediaries maintain partial control over both the reserve ratio and the deposit-to-currency ratio.

Banks can raise the deposit-to-currency ratio by encouraging individuals to deposit their savings or buy equity shares in the bank. The Goldsmith data in Table I indicates that, while the universal banks' assets were expanding as a share of German GNP, the British deposit banks accounted for a greater share of that country's GNP at each point in the pre-War era.

[16]See Bruce Champ and Scott Freeman (1994) and sources cited there.

Total bank assets (or liabilities) less cash offers another measure of the volume of capital mobilized by the British and German commercial banks. As a share of GNP, liabilities less cash in the British deposit banks exceeded that in the German universal banks by a significant margin from 1883 until after the turn of the twentieth century (Figure 1).[17] While the gap between the UK and Germany seems to have mostly closed by the outset of World War I, the series diverge again during the war and its aftermath.

Figure 1 here.

Figure 1 also reveals a clear difference in growth rates of liabilities less cash per capita in the two countries. When the shift in coverage for the British series is taken into account, the trend for that country is relatively flat. The German figures, in contrast, indicate gradual expansion before 1894, but rapid growth thereafter.[18] The disparity in growth rates may be explained by the different patterns of industrial development of the two countries, however, the late development of the German joint-stock banks is somewhat surprising. Joint-stock universal banks began to form in 1848, yet the institution seems to have taken off more than forty years later and after the industrialization pushes of the mid-nineteenth century.[19]

While the commercial banks clearly represented a greater share of the economy in the UK

[17]The British data come from the *Economist* series as reported in Sheppard (1971) and include private banks starting in 1891. The solid line in Figure 1 estimates the joint-stock banks' liabilities based on the ratio of private to joint-stock banks in 1891, but that ratio likely declined significantly between 1891 and 1913. The German data report only joint-stock banks for the whole period. Since the private banks accounted for a greater share of bank assets in Germany than in the UK, the omission of private banks may exaggerate the British lead. Even if estimated figures for the German private banks are added, however, some gap in liabilities less cash per capita still remained as late as 1913. Furthermore, the denominator for the German series is net national product, and the ratio may therefore overestimate bank liabilities as a share of GNP. The GNP/NNP data come from Mitchell (1978)

[18]Regression of of the log of liabilities less cash on a time trend yields an estimated annual average growth rate of 8.6 percent in the post-1894 period as opposed to a rate of 5.1 percent before1894.

[19]To some extent, the apparent late take-off of the universal banks is due to the switch to the joint-stock form. Private banks were more prevalent before 1894 than after. Inclusion of the private banks would flatten the trend, but it is not clear that the private banks provided the same services in the same way as the later joint-stock banks.

than in Germany, the universal banks may have expanded available capital at a faster rate. Indeed, the faster growth rate of German bank liabilities compared to British bank liabilities suggests this might have been the case. Two measures offer some insight into the banks' role in multiple expansion. The simple representation of the money supply (equation 2) indicated that the money multiplier is a negative function of the cash-deposit ratio. In the case in which banks are financed by equity or private capital in addition to deposits, a more relevant ratio may be the cash-liabilities ratio. In comparing the British and German cases, both ratios are informative.[20]

For Germany, the cash-liability ratio hovered in the five to six percent range in the late 1880s and early 1890s, but it declined considerably after 1893. The declines in the German universal banks' cash-liability ratio coincides with the growth of liabilities less cash of those banks. Over the same period, the British banks seem to have maintained considerably higher cash-liability ratios, and the gap appears to have widened after 1893 (Figure 2).

Theoretically, at least, the cash-liability ratio affects monetary expansion, interest rates, and economic growth. Yet banks' holdings of cash cannot be taken as exogenous, and differences in the way in which British and German banks funded themselves help explain part of the gap in cash-liability ratios. British deposit banks financed a greater share of their operations with deposits than did the German universal banks, and the provincial banks in the UK also issued notes. After the formation of the German central bank (the Reichsbank) in 1876, universal banks were prohibited from issuing their own notes.

Given the divergent liability structures of the German and British banks, the cash-deposit

[20]The data for the two ratios come from two sources: Sheppard's (1971 [1873]) compilation of the Economist's series and Capie and Webber's (1985) newer estimates. The latter only provide cash and deposit figures, so the cash-liabilities ratio cannot be calculated from this source.

ratio offers greater insight into the banks' participation in changing short-term liabilities into longer-term assets (maturity transformation). Among the German universal banks, cash-deposit ratios follow a similar, though more extreme, pattern as cash-liabilities ratios; rising over the late 1880s and declining after 1893. Until the last years of the nineteenth century, German cash-deposit ratios exceeded the UK ratios, and the gap reached as much as ten percentage points around 1891.

Unfortunately, the Deutsche Bundesbank's aggregate data for Germany begin only in 1883, so it is difficult to compare the system-wide cash ratios before then. Walther Hoffman (1965) compiled statistics on share capital from several sources and estimated the balance sheet structure from some of those sources.[21] According to the Hoffman data, the German joint-stock banks' reserve-deposit ratios varied considerably between the early 1850s and the mid 1870s. Though data are absent from 1863 to 1868, the data for the other years indicate that the banks appear to have maintained higher reserve ratios in the third quarter of the nineteenth century than in the ensuing forty years (Figure 3).

Further insight into reserve holdings emerges from historical accounts of one of the largest German banks, the Disconto-gesellschaft. Naturally, aggregate trends cannot necessarily be inferred from the experience of a single bank, but a comparison of years in which the series overlaps with that for the nine Berlin great banks (1884-1900) yields encouraging results. With the exception of two or three years, the DG ratio falls within a couple of percentage points of the great-bank aggregate ratio.[22]

[21] Hoffman did not report cash, but he did give reserves and total deposits (including current accounts). Using reserves as an estimate of cash allows construction of a reserve-deposit ratio. In the later years in which the sources overlap, the reserve ratio series is nearly identical to the cash-deposit ratio series constructed from the Bundesbank data. Between 1883 and 1895, however, the Hoffman series falls significantly below the Bundesbank series.

[22] Note that Figure 3 shows the figures for all joint-stock banks. The largest Berlin banks and the London

If the DG figures correspond at all to trends in the other Berlin banks' cash ratios, then the data suggest that the Berlin banks held higher proportions of cash than the London joint-stock banks for most of the period from 1871 to 1900. The Hoffman figures suggest similar conclusions for the joint-stock banks as a whole, though the British and German figures are quite close during the late 1870s and early 1880s. In the absence of figures for London banks before 1870, it is difficult to know how the German and British trends compare. Numbers for the London and Westminster Bank, reported in Walter Bagehot (1962), indicate cash-deposit ratios for this one institution between 10 and 20 percent from 1845 to 1857.

Perhaps of greater interest, the Hoffman, Disconto-gesellschaft, and London and Westminster numbers all suggest the potential variability of cash ratios. While the extreme fluctuations of the DG series likely stem partly from idiosyncracies of this bank, all three series demonstrate significant ups and downs that probably reflect changes in the economy at large. Such movements thus underscore the dependence of cash ratios on factors often outside the control of banks.

Neither the British nor the German banks were bound by minimum reserve requirements in the pre-World War I period. Legally, then, the reserve ratios in both systems depended on the judgement of the bankers. Some have argued, however, that the Bank of England tacitly imposed a ratio on commercial banks. The data on cash ratios indicate that the British deposit banks held relatively steady cash ratios throughout the end of the nineteenth and the start of the twentieth centuries. The London joint-stock banks, as a group, appear to have maintained cash balances between 10 and 15 percent of deposits. While the data certainly cannot prove

banks all held significantly higher cash ratios than their provincial counterparts, though the gap in Germany gradually disappeared as the banking sector concentrated (between 1900 and 1913).

the role of the central bank, the apparent floor at ten percent lends credibility to the notion that the Bank of England held some sway over the banks' minimum cash ratio.

In contrast, the largest German banks kept aggregate ratios as low as 7 percent and as high as 22 percent. Thus, if the Reichsbank was trying to impose a minimum reserve, it was either a low bound or it was largely disregarded by the banks. Commentaries from the early years of this century indicate that bankers, politicians, and economists often debated the need for a required reserve, but little was done toward imposing regulations like those enacted in the US.[23]

Whether the British and German central banks imposed minimum reserve ratios on commercial banks, such regulations would only create a lower bound. A profit maximizing bank will hold reserves up to the point at which the expected (opportunity) cost of holding cash equals the expected benefit of lending out those funds. The expected cost of idle cash is equal to the expected gross return on alternative uses of the funds less the transactions costs associated with investing.[24] The expected benefit of holding cash is then the expected price of obtaining reserves times the probability of needing those reserves. Thus, at least four variables directly influence banks' choice of reserve holdings.

On the benefit side, both government policy and securities markets help shape expectations about the availability of reserves. If the central bank credibly commits to acting as a lender of last resort, then the benefits of holding cash decline. Likewise, efficient and liquid secondary

[23]Most proposals recommended required cash holdings of one to five percent of the sum of deposits and current account balances to be held at the Reichsbank. Defenders of the German joint-stock banks claimed that the British banks held much slimmer reserves than the Germans. The British banks were accused of padding their reserves for their semi-annual statements of account. See Riesser (1910, 11) and sources cited there. Goodhart (1972) also discusses the reporting practices of the British banks.

[24]Of course, with an imperfectly competitive banking sector, banks may hold excessive reserves in order to exercise market power.

markets in industrial securities offer further assurance about the accessibility of cash reserves. Both of these factors could be expected to influence banks' asset portfolios, but both should have long-term effects. Central bank credibility, almost by definition, cannot fluctuate from year to year; and secondary markets' size and liquidity, are likely to change gradually.

The data from the Disconto-gesellschaft and the Hoffman series indicate large fluctuations in cash ratios from the 1850s through the early 1870s, but smaller annual changes after 1875. Reduced variability of cash ratios may stem partly from increasing credibility of the central monetary authority. The unification and regulation of the German currency as well as the institution of the Reichsbank in 1876 likely lowered the perceived costs of obtaining reserves during crises.[25] In Germany, the downturns of the early 1890s and 1900-01 were met with much smaller increases in cash ratios than the recessionary years of 1857 and 1872. Likewise, the onset of World War I seems to have spurred only a mild increase in cash ratios compared to the spike (at least at the DG) during the Franco-Prussian War of 1870.

The Bank of England has a much longer history, and its role both as lender of last resort and as regulating authority may have been relatively secure in the minds of British bankers. The combination of these two functions probably dampened the potential swings in cash ratios: limiting the need to pad reserves in recessionary periods, and restraining the impulse to drop reserves in expansionary years. If the London and Westminster numbers reflect broader patterns in England, however, then British cash ratios may have also fluctuated more in the mid-nineteenth century than they did after 1870.

The liquidity of the British banks' secondary reserves, however, may have begun to decline starting in the 1890s. While government securities ranked among the most secure options for

[25]The Reichsbank was founded in 1875 but began operation at the start of 1876.

UK banks' secondary reserves, some doubt, at least in the case of British Consols, began to arise toward the end of the 1890s: "It was formerly said that you could sleep on Consols and 'sell them on a Sunday.' A banker can certainly do the first now, but we are by no means so sure that he could do the second"[26] Thus, the gradual increase in cash ratios after the mid-1890s may also partly reflect a substitution away from government securities.

The probability of needing reserves, on the other hand, may vary considerably from year to year. Economic expansion and low rates of business failures likely decrease the probability of needing reserves and therefore lower the benefit of holding cash. In addition, systematic differences in the type of investments made may lead to variation in cash reserves from one financial system to another, and such disparities may persist for several years.

Expected rates of return on investments may also change significantly from year to year, but are likely to have a trend component as well. Increases in expected returns, either because of a contraction in the supply of funds or due to improvements in opportunities, raises the opportunity cost of holding cash, increases bank lending, and lowers banks' cash holdings. Costs of investing provide a countervailing force to expected rates of return on investments. Progress in information, communications, and transportation, for example, would tend to lower transactions costs, raise net returns on investment and lower cash reserves.

The changing patterns of cash ratios in both Britain and Germany could partly reflect the vast improvements in infrastructure from the middle of the nineteenth century on. The experience of the Wales Bank during the crisis of 1878 (in the UK) offers some support for such an hypothesis: "happily methods of transport were at this stage much swifter than on

[26]The Bankers' Magazine, 1900, quoted in Goodhart, 1972, p. 127. Also see W. F. Crick and J. E. Wadsworth (1936), p. 192.

a similar occasion thirty years earlier...Accordingly, the demands were fully met and the run quicky subsided."[27]

Clearly, many of the factors involved in determining the cash-deposit ratio fall outside the purview of the banks; thus, the structure of the banks themselves may have a limited impact on the ratios maintained. At the same time, the banks do maintain significant control over their investment portfolios, and the riskiness of those portfolios must also affect the banks' assessment of the need for cash reserves. Banks' structure and activities may significantly influence the composition of asset portfolios, and the different levels of bank specialization may therefore partly explain the somewhat divergent patterns of cash ratios–and thus of capital expansion–of British and German banks.

Quality of Investments

The banks' role in mobilizing capital is intimately tied to its involvement in the utilization of funds. Through decisions about how to lend and invest funds, banks can influence the quality of capital formation (A in equation 1). As with capital mobilization, the German universal banks are thought by many to have offered advantages over the British banks in promoting the efficient use of financial capital. The literatures on German and British banking have suggested that the British banks invested rather conservatively, while the German banks opted for riskier strategies. Such risky investment, it is argued, channeled funds into high-growth and high-return industries and helped promote Germany's industrialization.[28]

Contemporary critics of the universal banks, particularly of the great banks, accused the

[27] Crick and Wadsworth (1936), p. 190. 'A similar occasion thirty years earlier' refers to the banking crisis of 1847.

[28] Tilly (1986) points out that given that the main clientele of the universal banks appears to have been large, older, publicly-traded enterprises, the banks may not have been actively involved in risky, innovative investment in general.

banks of fomenting stock market speculation with their excessive provision of credit. Yet Jakob Riesser (1910, 1911) argued at length that the German banks invested more safely and conservatively than the British banks. Defenders of the German banks, those who resisted the calls for reform toward the British model of banking, claimed that the British banks lent to brokers who in turn swindled the public with speculative ventures.[29]

For influencing the quality of investment, the crucial organizational advantage of the German banks is their supposed long-term direct participation in industrial firms. By holding industrial shares, the banks are thought to have monitored and even controlled the firms they financed. The British banks, in contrast, are traditionally accused of having little to do with industry and are criticized for taking a short-term, arms-length approach to industrial lending.

There are several theoretical reasons why bank equity holdings may increase the efficiency of investment. Many of these hypothesis originate in the idea that asymmetric information between borrowers and lenders pose extra costs and create inefficiencies in the selection and funding of investment projects. Cost reductions may result from disciplining of management, oversight of investment planning and outcomes, optimizing risk-taking by firms, and aligning banks and firms incentives for long-term benefits.[30]

Kose John, et. al. (1994) model the effects of equity ownership on the risk-taking of firms and show that investment efficiency increases in the proportion of bank financing held in the form of equity. Imperfect oversight of investment choices and outcomes creates incentives for firms to use borrowed funds in an excessively risky manner. When banks maintain veto power

[29]Riesser (1910, 1911) cites sources (Heiligenstadt and Jaffe, for example). It should be borne in mind that Riesser was a director of one of the largest Berlin banks.

[30]Myers and Majluf (1984) analyze many of these theoretical issues and provide a formal model of the potential suboptimality of investment under asymmetric information.

over the use of funds, pure debt holdings induce the bank to minimize risk in order to guarantee the fixed return. Equity holdings, in contrast, encourage the bank to seek higher firm valuation. Thus, the greater the banks' equity holdings in the firm, the closer the banks' incentives are to the efficient tradeoff between risk and expected return.

In related work, Anat Admati and Paul Pfleiderer (1994) also demonstrate the potential importance of equity stake holders in resolving agency problems associated with multi-period financial contracts. Explicitly motivated by modern perceptions of the German and Japanese banking systems, this model shows that the efficiency of inside investing hinges on the use of fixed fraction contracts. In such arrangements, the investor receives a fixed percentage of project returns and finances that same proportion of future investments.[31]

According to these theoretical arguments, banks that hold firm equity stakes improve the efficiency of investment. Thus, the relative extent of equity holdings in the portfolios of British and German firms offers one way to assess the direct involvement of the banks in raising investment quality.[32]

The British banks' total securities holdings ranged between 13 and 20 percent of total assets between 1884 and 1913, while those of the German banks stayed between 9 and 15 percent over the same period. Moreover, the British ratios remained above the German ratios for the entire period. As previous authors have pointed out, the British banks held a substantial proportion of their investments in the form of British and colonial government and government-guaranteed assets. Since such assets are unrelated to industrial finance, and are typically more secure than other types of securities, it is important to compare asset distributions net of

[31]Repeated interaction naturally adds the problem of renegotiation. Admati and Pfleiderer (1994), Persons (1994), and Dybvig and Zender (1991) all address this question.

[32]The remainder of this section borrows heavily from Fohlin (1997c).

government securities. Thus, Figure 4 compares non-government securities for the two countries. Because of the uncertainties about valuation and reporting, these figures should be viewed as approximations.[33]

Figure 4 here.

When government securities are excluded, the ratios are much closer together; however, the German banks still show no consistent tendency toward higher securities holdings than the British banks. Indeed, according to these estimates, the range was nearly identical in the two countries (7 to 12 percent for the German banks and 8 to 12 percent for the British).

The figures, it should be noted, provide as conservative an estimate as possible of the German and British non-government securities holdings. The Scottish and Irish deposit banks held higher levels of investments than did their English and Welsh counterparts, and the largest of the German universal banks held more of their assets in the form of securities than did the provincial banks. Therefore, the fact that Figure 4 still shows the British banks' securities holdings on par with the Germans' provides a strong indication that, despite the difficulties in measurement, the British banks held a similar position in non-government securities as the German banks.

Such a finding would fall in line with expectations, if one thought that the two types of

[33]The Sheppard series gives British government and government-guaranteed investments separately from all others, but such disaggregation for the German figures begins only in 1912. The figures for the years before that are estimated on the basis of the lowest holdings of government securities between 1912 and 1920 as well as on the detailed account of one of the great banks between 1896 and 1899. The proportion for great banks ranged from 17.6 to 28.6 percent of total securities held between 1912 and 1920. Given that this period covers the first World War, it would be natural to expect that government securities might comprise a higher proportion of securities than they did in the preceding years. In the one detailing of bank securities holdings that I could find for the period before 1900 (Bank für Handel und Industrie, a great bank), government securities amounted to 24 to 55 percent of total securities (in the period 1896-1899). Thus, since I am trying to err on the side of finding high rates of non-government securities holdings, 17 percent seemed a conservative enough estimate of the proportion of all great bank securities held in the form of government securities.

banks were roughly similar. The predominance of underwriting and brokerage functions among the universal banks, however, should have led to higher levels of securities holdings at German banks compared to the British commercial banks. Thus far, the numbers for the German banks have included securities holdings resulting from their underwriting and brokerage business.[34] A significant portion of the universal banks' total investments arose out of their involvement in underwriting consortia (or syndicates). These participations therefore include some shares that remained on the banks' books only temporarily and because of the banks' inability to place the shares. Thus, Figure 4 also plots out the non-government securities held by the great banks that did not arise out of the syndicate business.[35] This series gives an approximation of the proportion of assets the universal banks may have held as non-government securities had the universal banks focused primarily on commercial activities.

It is useful to compare the estimates for the largest German banks to the securities holdings of British institutions engaged in investment banking. Phillip Cottrell provides two such examples, and his data illuminate the extent of securities holdings of investment bankers in the mid- to late-nineteenth century. One example comes from the General Credit and Finance Company, which in 1866 held approximately 15 percent of its assets in the form of securities. The majority (approximately three quarters) of this amount was held as shares.[36] Many of these shares were probably of railway companies, but it is impossible to tell from the given figures.

[34] According to Riesser (1910), the largest universal banks earned approximately half of their gross profits from underwriting and brokerage services.

[35] Non-syndicate securities were estimated using a similar method as that described for non-government securities. For the years in which disaggregated securities holdings were reported (1912 to 1919), syndicate-related securities amounted to 51 to 61 percent of total securities held. As with government securities, I used the lowest number during the period to estimate the proportion of securities due to syndicate participations.

[36] Cottrell (1985), p. 419, reproduces the firm's balance sheet as given in *The Economist* of November 1866.

A second investment bank, the International Financial Society, apparently held even higher proportion of securities among its assets. In 1872, the bank kept nearly a quarter of its assets in the form of securities and listed another 50 percent in the form of 'lock-ups.'[37] 'Lock-ups' included all assets not readily liquidated, and as such, consisted partially of loans. By 1877, the International Financial Society had increased its securities holdings to 56 percent of assets.[38] By contrast, the German universal banks reported liquidity coefficients (the ratio of immediately available or quick assets to total liabilities) of 85 percent in 1893. These figures gradually declined by more than 20 points over the ensuing 15 years.[39]

Naturally, these banks cannot be compared directly with the German universal banks, but the forgoing examples do support the notion that the great banks in particular, because of their active engagement in investment banking, should be expected to have held a significantly greater share of their assets in the form of securities than did the British deposit banks. Comparison with the British investment banks also underscores the potential inconsistency in the idea that universal banks could hold substantial long-term (illiquid) engagements with industrial firms and still operate a commercial business on the order of the British deposit banks.

To understand how important the banks' direct investment in industrial companies may have been for the growth of the economy, it is useful to combine the data on bank investments with that on bank assets relative to the economy as a whole. Table 2 reports the results of the calculation and indicates that the non-government securities holdings of the universal banks ranged between two and four percent of GNP for the three decades preceding World War I. Even if the estimates are only approximately correct, the banks' holdings of non-government

[37] *Ibid*, p. 538.
[38] *Ibid*, p. 599.
[39] Riesser (1911), p. 655, discusses the banks' liquidity at length.

securities accounted for a very small share of the economy. The German banks' share did increase after 1880, but their holdings of non-government securities still only amounted to four percent of GNP by 1913. Furthermore, the biggest part of the increase came after the major push of industrialization in Germany.

Table 2 here.

The British banks' holdings of non-government securities, though also low relative to GNP, were significantly higher than the German numbers throughout the period. In contrast to the German case, the banks' securities share of GNP rose between 1880 and 1900 and then leveled off. Given the measurement difficulties already discussed, however, it is best not to overemphasize the differences between the German and British numbers. Nonetheless, these calculations cast doubt on the idea that the banks' holdings of securities provided a significant stimulus to either the German or the British economies during the last half of the nineteenth century.[40]

It is often claimed that the British banks held only gilt-edged securities in their portfolios and that the German banks participated more actively and directly in risky, start-up ventures. The official figures, however, do not allow specific types of securities to be distinguished. Such distinctions, unfortunately, depend on spottier evidence from individual banks. German Bank records for the pre-1880 period are generally unavailable.[41] Nonetheless, some details are available for two of the earliest German joint-stock universal banks.

[40] One might raise the point that market capitalization represented a greater share of the economy in Britain than in Germany. Thus, the banks' equity holdings may actually represent a greater proportion of share capital in Germany than in the UK. Such figures may be interesting from the point of view of the banks' involvement in the secondary market for shares, but the ultimate impact of the banks must be measured against the economy as a whole.

[41] The chief archivists of both the Deutsche Bank and the Dresdner Bank have indicated that the archives contain no details of securities owned in the pre-1914 era.

Figure 5 brings together the available data and traces the movements in the ratio of total securities to assets for these two banks.[42] The solid lines represent the holdings of the Disconto-Gesellschaft, while the squared points plot the data for Darmstädter Bank. The fine line comprises all securities held by the DG over the period 1852 to 1900 and indicates that such holdings ranged between zero and 35 percent of assets over the period. The bank held no securities in its first four years. The proportion of securities holdings rose to around 12 percent of assets in 1856 and grew rapidly over the following few years. The bank seems to have unloaded securities during the boom years of the early 1870s but then took on extremely high shares of securities during the middle of that decade. While the bank's holdings continued to fluctuate throughout the remainder of the nineteenth century, the proportion of securities followed a generally downward trend toward the end of the period.

figure 5 here.

A quantitative breakdown of securities 1856 to 1865 indicates that two mining companies, Heinrichshütte and Bleialf, accounted for the lion's share of DG's industrial holdings; averaging around 11 percent of bank assets during this period. Däbritz chronicles the bank's involvement with these firms and indicates that direct participation arose out of the bank's intention to convert the firms into joint-stock companies.

Having bought up Heinrichshütte in 1857, the bank invested heavily (equivalent to 25 percent of the firm's capital) in the expansion of production capacity. The timing was inopportune; immediately the firm faced rapidly-falling prices of iron and uncertainty about the profitability

[42]Walther Däbritz (1931) presented a sketch of the activities of the Disconto-Gesellschaft (DG) in its early years, and a later *Festschrift* published the annual accounts of the bank through 1900. Evidence from a different source, *Saling's Börsen-Jahrbuch*, sheds light on the holdings of the Darmstädter Bank (Bank für Handel und Industrie).

of ironworks in general. In the six years following the bank's investment in the ironworks, according to Däbritz, "hardly a general meeting passed in which the bank's management did not have to defend against sharp criticisms about the purchase of Heinrichshütte."[43] The other two firms presented similar problems for DG, and the bank was forced to hold their shares until they could extricate themselves in the more favorable market of the late 1860s and early 1870s.

The heavier line in figure 4 shows the proportion of DG's assets held in securities other than Bleialf and Heinrichshütte. The vast majority of these assets were held in relatively conservative investments: government debt, railway shares and bonds, and other priority bonds and shares. With the exception of a few unimportant holdings of shares, the DG confined its participation in industry to three companies (the two already discussed plus another mining concern). Indeed, the bank's holdings of industry stocks amounted to between zero and three percent of its assets for the years in which disaggregated data are available (1852-1865).[44]

In his discussion of the early industrial promotion activities of the Bank für Handel und Industrie, another of the great banks, Tilly (1967) shows that, while the bank was energetic in such activities in its first 4 years, it had difficulty placing shares at reasonable prices. By the early 1860's, BHI had extricated itself from this side of the business and had turned to railway and government finance. Thus, it can hardly be argued that even the early activities of the great banks involved extensive, direct involvement in industrial companies.

Though the disaggregated data for DG run out before the second wave of the German industrialization hit its peak, the story can be picked up in the 1880s using evidence from the Darmstädter Bank (BHI). Table 3 gives securities by broadly-defined type for 1896-99 as well

[43] Däbritz (1931). p. 105. The firm's earnings yielded only a two percent average return on the bank's invested capital.

[44] *Ibid.*

as the individual industrial shares owned at several points throughout the 1880s and 90s—both taken from *Saling's*.[45] It is clear from the figures in Table 3 that holdings of industrial shares amounted to less than one percent of BHI's assets for most of the 1880's and 90's, and that, even at its peak, the proportion of industrial shares to assets only reached 1.3 percent (in 1882). The top section of Table 3 gives the breakdown among various types of securities and shows that, including railway and real estate shares, the total of non-bank equity shares probably reached only four percent of assets. When bank shares are included, the total rises to no more than 6.5 percent. It should be underscored that the earlier numbers are estimated based on the ratio of industrial shares to total securities for the period in which both types of data are reported (1896 and 1897).[46] Finally, BHI reported substantial holdings of only 12 different companies between 1882 and 1897 and no more than seven firms in any one year. Together, these data provide further support for the notion that the great banks invested a relatively small portion of their portfolios in long-term stakes in industrial firms.[47]

Table 3 here.

As for the securities holdings in Britain, Goodhart provides some details for three British commercial banks (Metropolitan Bank, London and Midland, and Union Bank). Nearly all of the investments reported consisted of British, colonial, or foreign government securities or railway stocks and bonds. Given his warnings about the banks' desire to hide any investments

[45]BHI published unusually detailed accounts of its securities holdings, and *Saling's* reproduced the information in its series on Berlin-listed companies. Unfortunately, *Saling's* only began publishing in 1876, and the volumes before 1882 are scarce. Also unfortunate for this analysis, *Saling's* stopped publishing details of securities holdings in 1899.

[46]The proportion of assets held in industrial, railway, or bank shares for those years peaked at 3.7 percent. Thus, only if BHI held a significantly greater part of its securities in the form of bank shares in the 1880s than in the 1890s (doubtful, given that the concentration of banking accelerated in the 1890s), would 6.5 percent be an underestimate.

[47]Again, it is recognized that the experiences of two banks may not necessarily be generalized to the population as a whole, however, these two banks do represent one fourth of the great banks.

in industrial firms, however, it is impossible to tell for sure what industrial shares the banks may have held. Edelstein, however, has provided estimates of securities holdings in the U.K. more generally, and those results indicate an expansion of industrial holdings between 1871 and 1913. Industrial concerns and railways, both foreign and domestic, accounted for 37 percent of all securities holdings in 1871 and 62 percent by World War I. Home companies alone increased from 4 to 17 percent of U.K. holdings over the period.[48] For the period between 1883 and 1907, Lance Davis and Robert Huttenback (1986) find that the financial community owned around five percent of UK share value and averaged four percent stakes in those companies. In addition, public companies, some of which may have been banks, held nearly four percent of domestic share capital. The banks might be expected to have participated to some extent in these investments, though firm proof of such a contention is apparently unavailable. Yet even if the British banks held no industrial shares, the evidence for DG and BHI suggest that the German universal banks were not far ahead on this count.[49]

It is important to note that the banks' ownership of shares, at the margin, may have provided important injections of liquidity or signals of quality for newly public firms. In a thin market for industrial securities, and in cases of lumpy investments, such holdings may permit firms to invest where they otherwise would not have. Thus, small and transient equity stakes may increase the quantity of investment (s in equation 1), even if they do not have the qualitative, efficiency effects that long-term holdings are thought to have. The aggregate evidence here, however, still indicates that such holdings represented a small proportion of bank assets; and

[48]Edelstein (1970), p. 235-7.

[49]The Societe Generale pour Favoriser L'Industrie Nationale in Brussels offers an interesting comparison. This bank held 27 percent of its assets in the form of industrial shares in 1849 and gradually increased such participation to nearly 40 percent by 1852. In 1849, this bank held stakes in around forty firms. See Otto Hübner (1854), pp. 170-6.

the examples of Disconto-gesellschaft and BHI suggest that only a few firms would have been affected. Since such equities may not have made it onto the banks' books, though, it is difficult to estimate the ultimate impact of transient holdings.

Share ownership represents only the most direct kind of involvement in industrial firms. The banks may have also participated indirectly in companies either through proxy voting of customers' shares or through positions in the firms' supervisory boards.[50] Because of their combination of underwriting, brokerage, and commercial services, the German banks probably obtained greater control of industrial shares than did the British banks. Since shares taken as collateral or simply held as a service to customers would not appear in the banks' balance sheets, and since firms did not have to reveal their shareholders, it is virtually impossible to quantify the extent of proxy voting by the German banks.

It is possible to quantify board positions, and such data suggest that the bank directors held positions in relatively few companies. Approximately 23 percent of German joint- stock companies had a private banker or bank manager on their supervisory boards, but only half of these attached companies received representation from the great banks.[51]

Proxy votes and supervisory board positions may have enabled banks to monitor their investments and even control the use of bank funds. From a theoretical perspective, however, it is unclear whether such indirect participation yields the same kind of incentive effects as direct ownership. In theory, at least, systems in which banks exert control over investment decisions, but do not align their incentives with the firms' through equity stakes, force firms

[50]The German supervisory board is comprised of shareholders' representatives. Currently, this body must also represent the firm's workers.

[51]Fohlin (1997a, b) discuss the prevalence, sectoral distribution, and determinants of interlocking directorates between banks and firms.

into excessively safe and thus inefficient investment programs. So, the German system of proxy voting and interlocking directorates may have increased bank control and oversight, but it may have led to more internal financing and less in the way of risky investments. Therefore, if the British bankers did wield less control over firms' investment decisions, then the British financial system may have yielded greater efficiency through benign neglect.

Concluding Remarks

The banking and economic history literature has made much of the apparent disparities in the structure and performance of the British and German banking systems; the banks traditionally have been presumed to have contributed more to economic development in Germany than in the UK. Based on recent theoretical models of economic growth, Equation 1 delineated three paths through which the financial system may promote real growth of the economy: quantity, quality, and efficiency of investment. Using evidence on bank financial structure, this paper has compared the contributions of the British and German banking systems in the first two of these three areas. The results yield no compelling evidence that one system consistently or significantly outperformed the other in raising the quantity or quality of investment.

The analysis demonstrates that the German universal banks, despite their involvement in all facets of corporate finance, accounted for a markedly smaller proportion of the economy than did the British banks. Further, the large gap of the 1880s, much of which may have been due to the later onset of industrialization in Germany than in Britain, only began to diminish after 1894 and never fully disappeared. The universal banks may have, however, expanded their available capital at a faster rate, since they invested or lent a greater share of their total liabilities than did the British banks. Much of the disparity in cash-liability ratios, however,

stems from the significantly higher share of deposits among the liabilities of the British banks. Until the late 1890s, the German banks actually maintained higher cash-deposit ratios than the UK banks did. Only with the serious onset of the deposit business in the mid-1890s did the German cash-deposit ratios begin their steady decline.

In situations in which external capital is needed to finance new ventures, banks may improve the quality of investment by taking equity positions in the firms they fund. Though the German banks are frequently credited for their active participation in industry, the findings show that the universal banks held only a small share of their portfolios in the form of industrial equities. Furthermore, evidence from two of the largest universal banks suggest that the universal banks may have held stakes in only a few firms and often did so for lack of demand for their shares. Based on the theoretical work on bank equity stakes, the paper also argues that, if the German banks wielded greater control (through board positions, for example) than the British banks over firms they financed but took no greater equity stakes in those firms, then the German system of relationship banking may actually have led to under-investment in risky projects.

This paper has raised the possibility that the German banks were constrained in their choice of investment and reserve holdings by the extent of the secondary market in securities. In addition, the findings suggest that the universal banks' equity stakes, proxy votes, and supervisory board positions in industrial firms likely arose primarily out of the banks' involvement in underwriting and brokerage services. Thus, the extent of the secondary market is linked to the structure of the banks and to regulations on the financial system.

Given the German experience, it is important to determine whether market internalization arises endogenously in a universal system or resulted specifically in the German case from the regulation of the stock exchanges. Listing requirements in Germany seem to have necessitated

investment banks or groups of investment banks large enough to underwrite the entire capital of new issues and with sufficient contacts to place the underwritten shares.[52] In addition, transactions taxes encouraged trading outside of the exchange. Thus, the regulation that encouraged the growth of universal banking in Germany also may have inhibited the development of securities markets. Therefore, the existence of universal banking, per se, may not hamper the functioning of securities markets.

Clearly, further work on this subject is required. But if specialized and universal systems of finance generally provide similar quantities and qualities of investment, then efficiency may prove to be the crucial determinant of the relative growth effects of the two systems. Universal banking may yield economies of scale or scope compared to a specialized system, but these economies may also lead to excessive concentration, market power, and inefficiency in the banking sector. In addition, the internalization of the secondary securities market within the banking system may hamper both the efficient distribution of financial capital and the market for corporate control. Such factors bear directly on the costs of finance, and such costs, as shown in equation 1, influence economic growth.

From the historical perspective, this paper makes further progress toward vindicating the British banks for their alleged under-performance over the half century before the first world war. At the same time, the findings here cast some doubt on the common perception that the German universal banks offered significant advantages in mobilizing capital and promoting particularly high-quality investment. Furthermore, the cases of Disconto-gesellschaft and the Darmstädter Bank indicate quite strongly that without a significant period of real development,

[52]For example, a firm wishing to gain listing on the stock exchange, among other things, was required to have fully paid up share capital.

financial institutions can offer only limited benefits for economic growth. As Tilly suggested thirty years ago about the universal banks, "where other ingredients of industrialization were in short supply, such institutions could produce few results of significance."[53] It may still be true that German industry has outperformed its British counterpart, but this paper suggests that differences in banking structure are probably not the cause.

[53]Tilly (1967), pp. 114-5.

Appendix A

While the level of investments may be important on its own, it is more illuminating to measure securities relative to other assets. Cash is fairly straightforward to compare internationally, however, other bank assets may be less obviously similar. It is therefore necessary to address the comparability of the various assets held by the banks. The data on investments come from published balance sheets, and accounting conventions differed somewhat between the two countries. Nonetheless, the various assets can, to some extent, be categorized by purpose, liquidity, maturity, and riskiness.

For both the British commercial banks and the German universal banks, financial assets other than investments fall into four broad liquidity or maturity classes: cash, very short-term loans, bills of exchange, and loans and advances. In the British case, very short-term loans, termed 'money at call,' consisted primarily of loans to stock brokers for transactions in the London discount market or the London Stock Exchange.[54] Universal banks usually included call money (*täglisches Geld*) under the more general heading of lombards and reports. While typically also maturing within days or weeks, German lombard loans provided credit both for securities transactions and for covering lags between merchandise delivery and payment. Despite some divergence of purpose, both German and British banks made short-term loans on similar collateral (bills of exchange and other securities), and their liquidity and maturity were comparable.[55]

It is important to note that the British and German banks may have booked their assets in different ways. The British commercial banks supposedly valued investments at or just

[54]See Goodhart, 1972, for further descriptions of bank balance sheet items.

[55]See Riesser, 1911, for details of the specific conditions on lombard loans made by one of the great banks, Berliner Handelsgesellschaft.

below market value, yet "investments could be held on the books at any valuation, subject, of course, to the auditors' approval."[56] Furthermore, it is clear that some banks failed to report any securities other than British, colonial, or other so-called gilt-edged investments. "Their holdings of these other securities were included with their advances or the miscellaneous item, to taste."[57] Thus, the British banks' investments are probably undervalued relative to other financial assets, though fixed assets were written down as quickly as possible in order to bolster hidden reserves.

The German universal banks also undervalued their assets, but again, the extent is uncertain. According to Riesser, "considerable security holdings are not regarded as a favorable sign, although during critical periods large holdings of this class may represent an increased proportion of particularly liquid assets, or a special reserve for deposits."[58] He goes on to explain that

> excessive holdings of securities will be interpreted to mean either that the times have not been propitious for the issue business of the bank, or that it maintains excessive speculative engagements, or that it is involved to an excessive extent in speculative transactions on its own account...or, finally, that it has been unable to find sufficiently profitable employment for its funds. It is for these reasons that a large proportion of the writing off done by the banks occurs under the head of securities account."[59]

In comparing the British and German banks, the important consideration is the relative extent of undervaluing, and that information, by its very nature, is difficult to ascertain.

[56] See Goodhart (1972), p. 21. He offers an extensive discussion of the accounting procedures of the banks.
[57] *Ibid*, p. 21.
[58] Riesser (1911), p. 402.
[59] Riesser (1911), p. 402-3.

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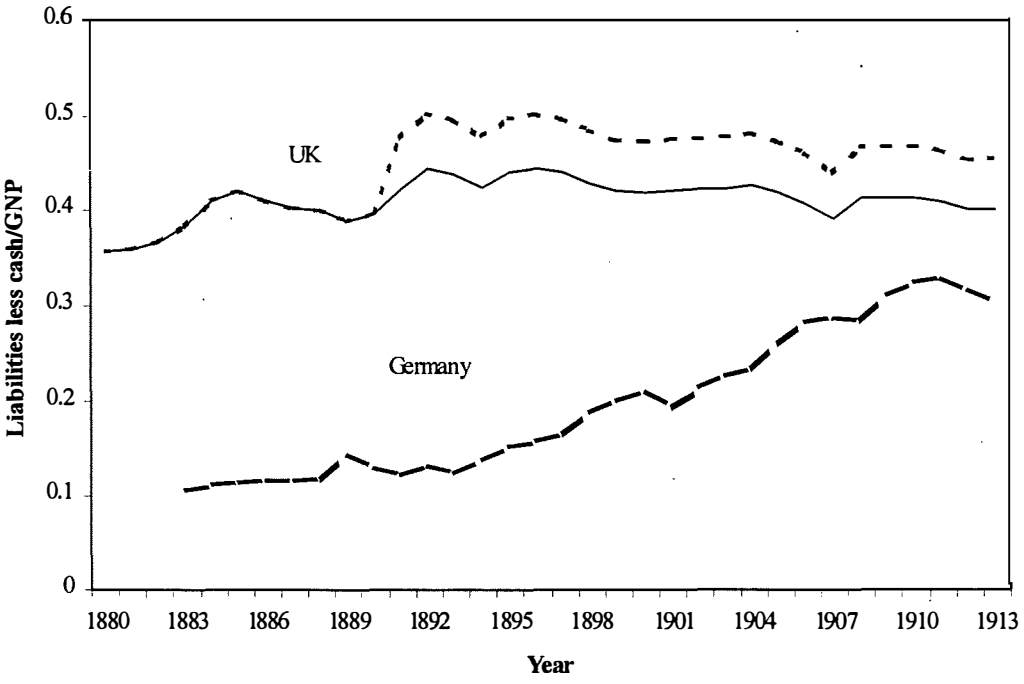

Figure 1 Total Joint-Stock Bank Liabilities Less Total Cash Holdings, UK and Germany, 1880-1913

Notes: Germany series is calculated using NNP (i.e., GNP net of capital depreciation), so the ratio is likely overestimated. The dashed UK line includes private banks; the solid line excludes private banks based on the ratio of private to joint-stock bank liabilities in 1891. This calculation tends to underestimate joint-stock bank liabilities in later years, since the ratio of private to joint-stock banks declined significantly after 1891.

Sources: UK, Sheppard (1971) and Mitchell (1978); Germany, Deutsche Bundesbank (1976) and Mitchell (1978).

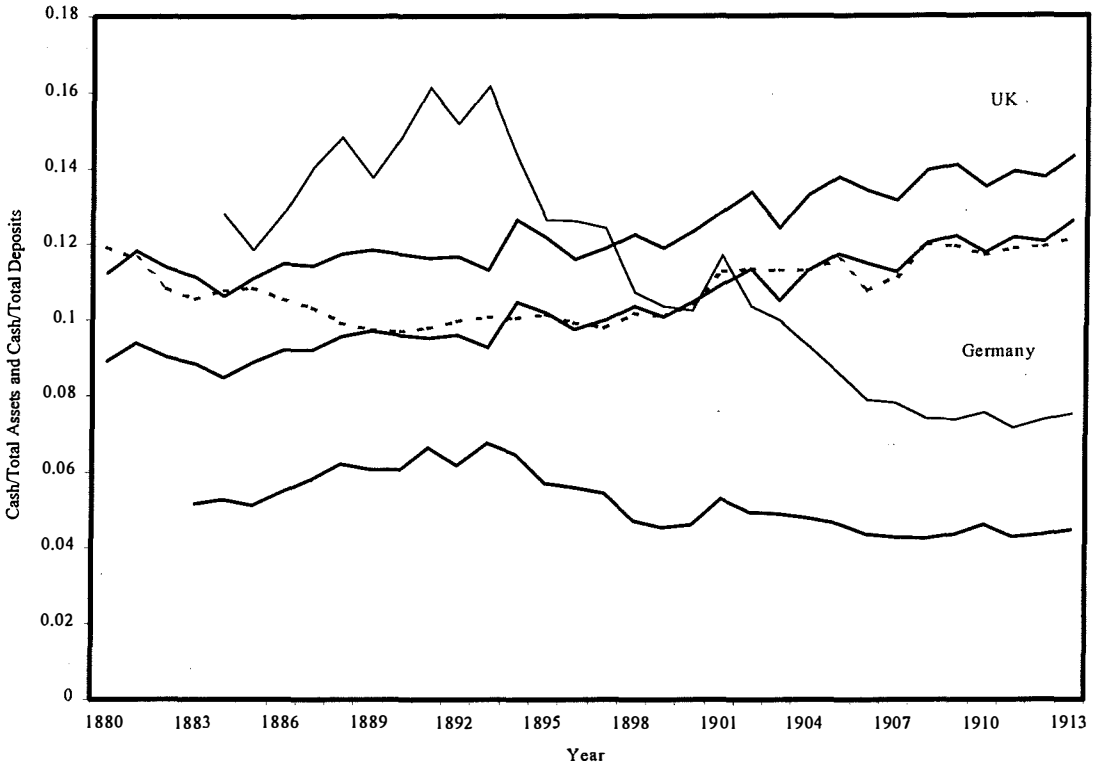

Figure 2 Cash-Asset and Cash-Deposit Ratios, UK and Germany, 1880-1913

Notes: Bold UK lines represent Sheppard's series for all UK banks (private banks are included after 1890). The dashed line represents Capie and Webber's data on UK joint-stock banks (including all Irish and Scottish banks). The German figures include all joint-stock banks.

Sources: UK, Sheppard (1971) and Capie and Webber (1987); Germany, Deutsche Bundesbank (1976).

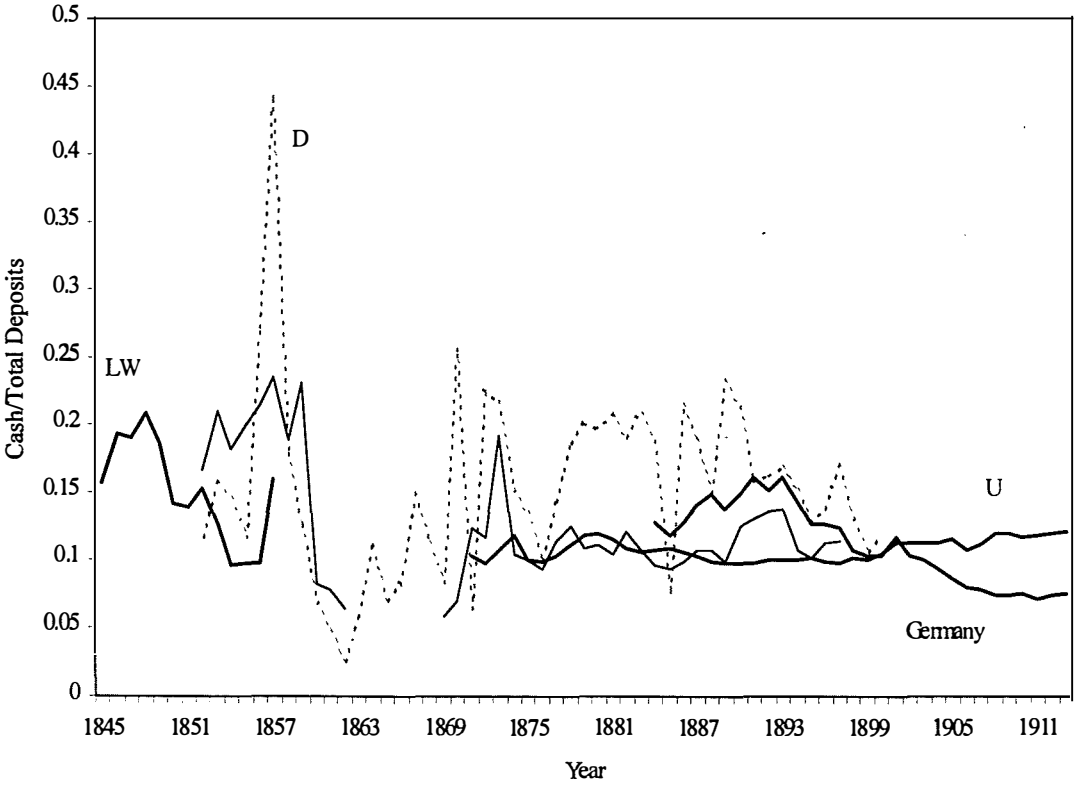

Figure 3 Cash-Deposit Ratios, UK and Germany, 1845-1913

Notes: UK series includes all Irish and Scottish banks (see notes to Figure 2). The fine solid line represents Hoffman's data.(using reserves in the numerator) between 1850 and 1897 and the Deutsche Bundesbank's data between 1884 and 1913. The two series converge after 1897. DG refers to Disconto-gesellschaft, and LWB refers to the London and Westminster Bank.

Sources: UK, Capie and Webber (1985) and Bagehot (1962 [1873]); Germany, Hoffman (1965), Deutsche Bundesbank (1976), and Disconto-gesellschaft (1901).

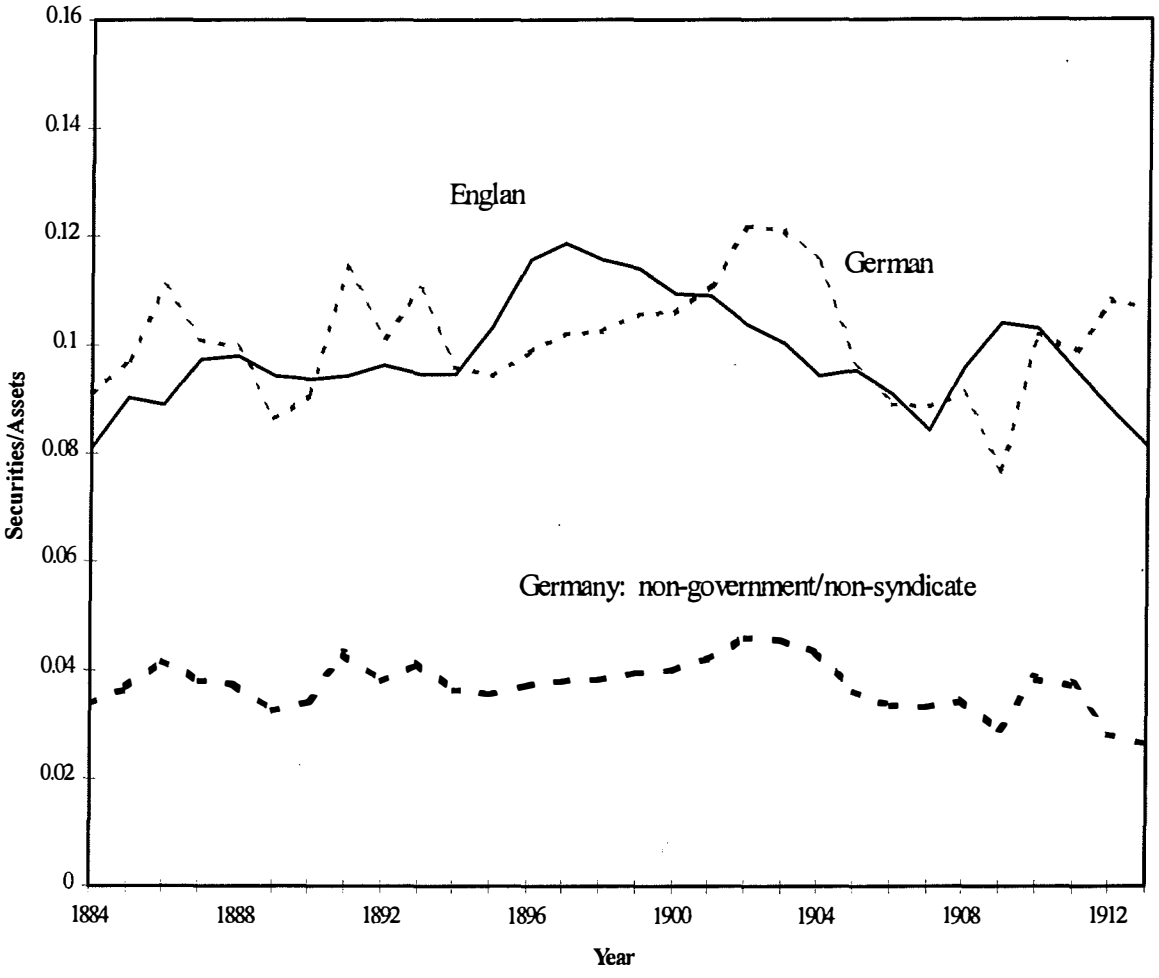

Figure 4 Non-Government Securities as a Share of Total Assets, UK and Germany, 1884-1913

Notes: Figures for the UK include England and Wales only and include private banks after 1890. Figures for Germany include great banks only (large, Berlin banks). See explanation in text.

Sources: UK, Sheppard (1971); Germany, Deutsche Bundesbank (1976).

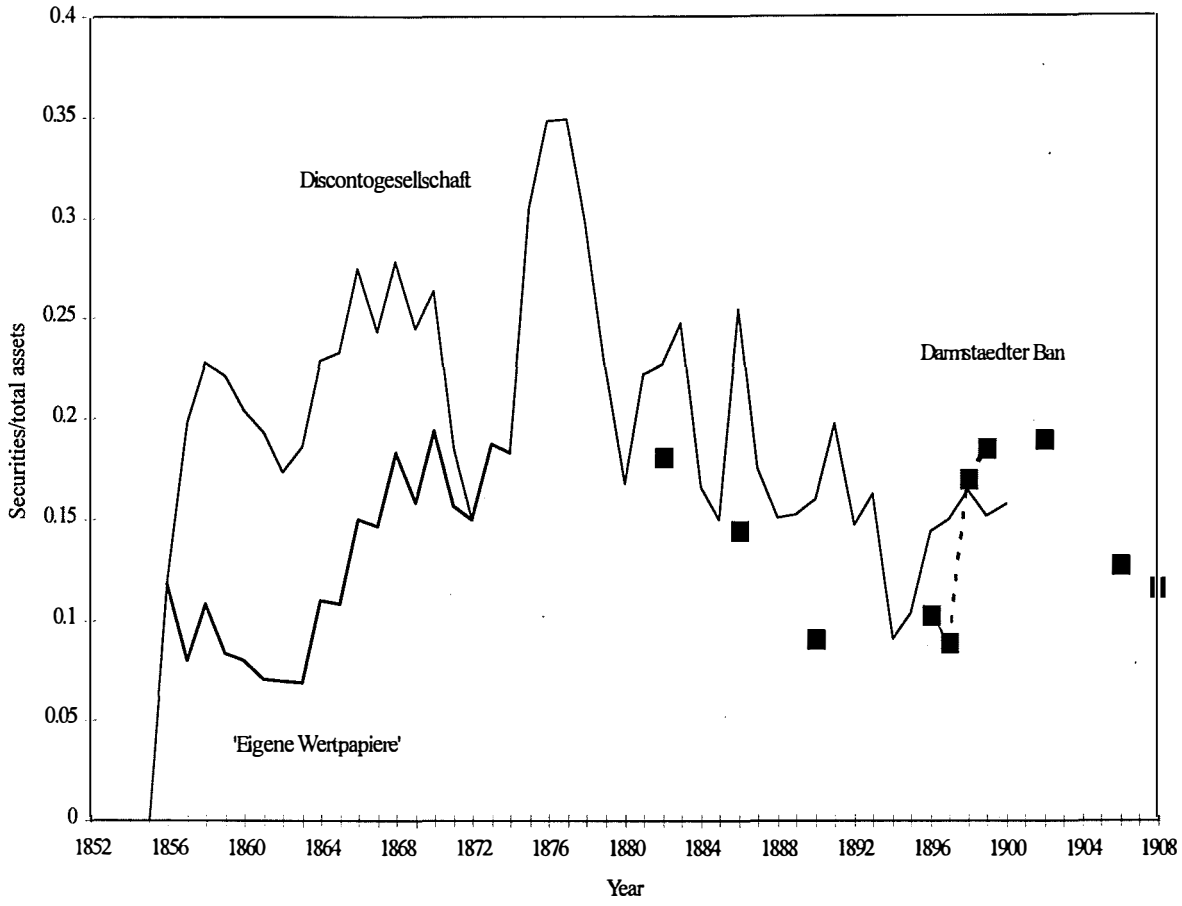

Figure 5 Securities as a Share of Assets: Discontogesellschaft (1852-1900) & Darmstädter Bank (1882-1908)

Sources: Disconto-gesellschaft, Däbritz (1931). Darmstädter Bank, Saling's Börsen-Jahrbuch, various years.
Notes: *Eigene Wertpapiere* refers to all securities other than shares of two companies (Heinrichshütte and Bleialf) held by the Disconto-gesellschaft. For both banks, all securities are included.

Table I
Assets of Financial Institutions

Germany (billions of Marks)	1860	1880	1900	1913
Central bank	0.95	1.57	2.57	4.03
Large (nationwide) banks	0.39	1.35	6.96	8.39
Regional (local) banks				13.65
Private bankers	*1.50*	*2.50*	*3.50*	4.00
Specialized commercial banks				0.98
Savings banks, local	0.51	2.78	9.45	20.8
Savings banks, central				1.76
Credit unions, local	0.01	0.59	1.68	5.73
Credit unions, central				0.47
Private mortgage banks	0.04	1.85	7.50	13.55
Public mortgage banks	0.68	1.76	4.05	*7.20*
Life insurance companies	0.07	0.44	2.42	5.64
Property insurance companies		*0.35*	*0.83*	2.05
Social insurance organizations			0.87	2.44
Total for all financial institutions	4.15	13.19	39.83	90.69
Joint-stock credit banks/total	0.09	0.10	0.18	0.24
Joint-stock & private banks/total	0.46	0.29	0.26	0.29
Assets of financial institutions/GNP	0.40	0.73	1.14	1.58
Joint-stock & private banks/GNP	0.18	0.21	0.30	0.45
Great Britain (millions of Pounds)				
Bank of England	*55*	75	93	100
Deposit banks	*150*	432	879	1,146
Private banks	*120*	*200*	62	53
Post office savings banks		35	134	187
Trustee savings banks	42	47	57	71
Building societies	*10*	54	60	65
CWS and SCWS banks			1	6
Discount houses		35	37	67
Investment companies and trusts			*100*	
Life and other private insurance companies	80	155	311	530
Collecting societies			5	11
Industrial and provident societies		11	34	78
Friendly societies			33	54
National insurance funds				21
Total for deposit banks & private banks	270	632	941	1,199
Total for all financial institutions	457	1,044	1,806	2,389
Deposit banks/total	0.33	0.41	0.49	0.48
Deposit & private banks/total	0.59	0.61	0.52	0.50
Assets of financial institutions/GNP	0.57	0.95	0.93	1.03
Deposit & private banks/GNP	0.34	0.58	0.49	0.52

Source: Goldsmith (1972).

Notes: Assets of large and regional German banks are summed through 1900. Estimates are italicized.

Table II
Bank Holdings of Non-Government Securities/GNP

	1880	1900	1913
Germany	0.022	0.027	0.040
Britain	0.044	0.063	0.058

Source: Calculated from Deutsche Bundesbank (1976) and Goldsmith (1972).

Table III
Securities held by Darmstädter Bank (1882-1899)

Securities by Type	Value of shares (thousands of Marks)						
	1882	1886	1890	1896	1897	1898	1899
German and Prussian bonds				1,845	1,301	1,145	5,909
Foreign government and railroad debt				1,422	891	4,797	3,230
Railway, industry, and land shares	*6,000*	*4,119*	*4,990*	5,104	3,942	3,343	4,741
Bank shares				2,571	1,950	1,919	1,694
Miscellaneous				1,033	965	681	955
Total securities				11,975	9,049	11,885	16,529
Total assets	146,516	169,532	181,133	206,761	188,865	232,762	235,372
Rail, ind., and land shares/securities				0.512	0.542	0.339	0.345
Shares/assets	*0.041*	*0.024*	*0.028*	0.025	0.021	0.014	0.020
Shares plus miscell. securities/assets				0.030	0.026	0.017	0.024
Government securities/total securities				0.154	0.144	0.096	0.357
All securities/total assets				0.058	0.048	0.051	0.070
Industrial Shares Owned							
Wiirttemb. Kattunmanufaktur	303	158	14	0	0		
Dessauer Wollengarn-Spinnerei	720	690	690	690	690		
Deutsche Gold- u. Silberscheide-Anstalt	420	0	0	0	0		
Frankfurter Hotel-AG	152	0	0	0	0		
Deutsche Wasserwerke	96	96	96	96	96		
Rheinische Wasserwerke	90	0	0	0	0		
Heilbronner Maschinenbau-Gesellschaft	86	86	0	0	0		
Wetterauer Zuckerfabrik	0	150	150	150	150		
Gross-Gerauer Zuckerfabrik	0	121	121	121	121		
Franken Compania Metalurgica de Mazarron	0	0	113	113	113		
Heilbronner Salzwerks	0	0	288	73	73		
Maschinen-anstalt Venulath & Ellenberger	0	0	0	100	100		
Miscellaneous	36	52					
Total industrial shares	1,903	1,353	1,472	1,343	1,343		
Industrial participations/total assets	0.013	0.008	0.008	0.006	0.007		

Source: ***Saling's Börsen-Jahrbuch***, various years.
Note: Estimates are in italics.